house fire was a large contributor to the evil and a most difficult one to contend against. He suggested filtering the air for the house through cotton wool filters and had found that it could be applied with great success. Mr. Warrington criticised the methods of analysis and would like to see the determinations extended so as to show in what quantity the respective sulphur compounds existed in the air. Dr. Rideal had found the method of determining sulphurous acid most reliable and preferable to the Gas Referee's test used for the estimation of sulphur in coal gas. Messrs. Hartog, Fairley, Thomas, Dr. Clowes and the President also spoke on the paper, and Dr. Bailey replied to various points which had come up in the discussion.

Subsequently, Prof. W. H. Perkin described methods of synthesis with the aid of butane and pentane tetra-carboxylic ethers the constitution of the methylene ring compounds being illustrated by Prof. Crum Brown by means of a very ingenious set of models.

A number of papers were carried over to the last day of the meeting mainly dealing with atomic weights and analytical work. Amongst these. Prof. Ramsay and Miss Aston contributed the atomic weight of boron (*a*) by determination of the water of crystallization in borax (*b*) by conversion of anhydrous sodium borate into sodium chloride. The value obtained was 10·966. Mr. Hartog drew attention to the results just published of a determination of the atomic weight of boron by the late Dr. Abrahall.

Prof. Ostwald read a communication on the assumed potential difference between metals in the solid and in the molten state. His experiments failed to detect any such difference of potential; it is at any rate below $\frac{1}{1000}$ of a volt. Prof. McLeod showed that the iodides of sulphur, SI_6 and S_2I_2, if they existed at all as chemical compounds, were of a most unstable nature; the only evidence of definite combination having taken place in S_2I_2 was that it melted at a lower temperature than either of its constituents.

BIOLOGY AT THE BRITISH ASSOCIATION.

So many important and interesting papers were submitted to the Organizing Committee of D this year that it was found necessary to divide the section into the three departments of Zoology, Botany, and Physiology. The plan of adjourning for lunch at half-past one, and resuming work again at two, with some attractive papers for the afternoon, was tried and found a success. Practical demonstrations and exhibitions were also given in the afternoons in the laboratories above the lecture-room.

On Thursday, August 4, after the president's address, the following series of reports by committees appointed at the Cardiff meeting was submitted: (1) The Zoology and Botany of the West India Islands; (2) the Naples Zoological Station; (3) Zoology of the Sandwich Islands; (4) Botanical Laboratory at Ceylon; (5) Migration of Birds; (6) Plymouth Laboratory; (7) Deep-Sea Tow-net; (8) Protection of Wild Birds' Eggs. All of these committees have this year been re-appointed with or without grants. Three papers were then taken in the afternoon, viz.: (1) Renewed experiments on the modification of the colours of Lepidopterous larvæ, with exhibition of specimens, by E. B. Poulton, F.R.S.; (2) Prof. Preyer, of Berlin, on the physiology of protoplasm; and (3) Prof. Hartog on the alleged personality of the segments of the nucleus, and Weismann's "Idant" theory of heredity. Prof. Preyer attributed an important part to the absorption of oxygen by the protoplasm in the formation of pseudopodia. Prof. Hartog contended, from previously ascertained facts, and from his own recent researches, that the view that the segments that constitute the young nucleus persist during its maturity is untenable, and that Weismann's "Idant" theory of heredity being founded thereon must necessarily fail.

On Friday, in the Botanical Department, important papers were read by Dr. Scott (on Secondary Tissues in Monocotyledons), Prof. Goebel (on the Simplest Form of Mosses), Prof. Errera (Physiological Action at a Distance), Prof. Bower (Morphology of Spore-bearing Members in Vascular Cryptogams), and others; these will be noticed elsewhere.

In the Department of Physiology there were the following:—

(1) Prof. Waymouth Reid gave a paper on Vital Absorption, in which he showed that the older views of Dutrochet and others as to the process being a physical one due to osmosis must be modified in the direction of showing that the vital activity of the cells composing the absorbing membrane must be taken into account. We know that changes are wrought upon substances during the process of absorption, such as the regeneration of serum-albumen from peptone. In the case of the intestine of the rabbit in full digestive activity, one can get evidence of a stream passing from within outwards so long as the tissues are alive. Scraping off the epithelium diminishes the transfer or puts a stop to it. By the addition of pilocarpine to the fluids used, it is possible to reverse the direction of the stream.

(2) Prof. Rosenthal, of Erlangen, read a paper on Animal Heat and Physiological Calorimetry. The apparatus he made use of has an air calorimeter. In fever, produced by injection of putrid matter, he finds that heat production is not augmented; although in a few experiments he made on man he found a small augmentation of heat production.

(3) Dr. Lockhart Gillespie communicated a paper on Proteïd-hydrochlorides, in which he stated that all proteids have an affinity for hydrochlorides, and the lower proteids combine with a greater percentage of HCl than the higher. These results were supported by the amount of silver which is contained in a series of the different proteid salts of silver, the ratio of silver to albumen being highest, and that of silver to peptone being lowest. The different stages of gastric digestion of a meal he finds to be:—1, the amylolytic stage—no free HCl being present, but some combined proteids—duration about ten minutes; 2, combined hydrochloric acid (proteid-hydrochloride)—acidity considerable, no free HCl, small amount of lactic acid present—duration about half an hour; 3, free HCl stage—some free HCl, but mostly combined, lactic acid disappearing; 4, the chief absorption stage—acidity falling, but proportion of free to combined HCl rising—from three to four or five hours; 5, evacuation—propulsion of contents of stomach into duodenum at fourth or fifth hour.

(4) Dr. E. W. Carlier gave an account of the hibernating gland of the hedgehog, which is situated along the cervico-dorsal and in the axillary regions, and attains its maximum dimensions in October—*i.e.*, just at the commencement of hibernation—and its minimum shortly after the animal has awakened from winter sleep. Histological examination shows that towards the close of hibernation many of the cells change. The chromation in the nucleus diminishes, the fat stored in the cell gradually disappears, and finally the whole cell breaks up. Dr. Carlier considers that the hibernating gland is not merely a storehouse for fatty matter, but actually secretes some nutritive material of great service to the animal during its winter sleep.

(5) Dr. G. Mann read a paper on the Functions, Staining Reactions, and Structures of Nuclei, in which he endeavoured to prove that the achromatic elements of a cell are the most important, and that the nuclear chromosomes are organs for the assimilation of food, while the centrosome is a trophic centre for the nucleus.

In the Department of Zoology, the following papers were read:—

(1) Dr. Henry C. McCook (Philadelphia), on the Social Habits of Spiders. This paper considered the claims of certain species of the Araneæ to possess in some degree the communal tendencies of the Social Hymenoptera. The eminent French araneologist, M. Eugène Simon, in his studies of South American spiders, finds a temporary sodality among certain orb-weavers (*Epeira Badelieri*) at the cocooning season, which Dr. McCook thought might be explained by the well-known fact that female spiders when cocooning often choose the same locality and mass their egg-bags, the one mother overlaying the cocoon of another. But this is quite incidental, and occurs with species which are known to be solitary. The close grouping of Simon's *Uloborus republicanus* was regarded as no proof of a sodality, but simply showed an assemblage of snares in proximity which is not uncommon. The gathering of males in groups on the outer lines of the webs is quite what one sees in other species with which there is no departure from the solitary habit. The third example of supposed social spiders (*Anelosinus socialis*) shows characteristics closely resembling those of young spiders of various genera, who will weave around themselves upon the foliage where they lodge a tent of delicate spinning work within which they dwell for a short space, and then scatter, every individual at once assuming the solitary habit. If Simon's observations be here confirmed, we shall have the transfer of this trait of young spiders in many species to the adult period of at least one species. The fact

would revolutionize our ideas of the universal prevalence of the solitary habit. The paper was illustrated with a number of large painted figures.

(2) Prof. A. Crum Brown, F.R.S., on a Use of the External Ear. The form of the external ear enables us to find the altitude of the source of sound by rotating the head about a horizontal right and left axis.

(3) Prof. Lloyd Morgan, the Method of Comparative Psychology. The object of this communication was to show that our interpretation of animal intelligence is necessarily based on a double or two-fold process of observation: 1st, the activities of animals have to be carefully observed as objective phenomena; 2nd, our own mental processes have to be carefully observed and cautious inductions drawn from them. Finally the objective phenomena reached by the first process have to be interpreted in terms of conclusions obtained through the second. In the higher animals there is abundant evidence of ability to sense or feel relations, but little or none of the perception or cognition of the relations of introspection or of reflection, and possibly herein we have a limit to animal intelligence.

(4) Mr. J. E. S Moore, on the Relationships and Rôle of the Archoplasmic Body during Mitosis in the larval Salamander. The author has extended the discovery of the archoplasmic body in the spermatocyte of the salamander to the somatic cells of both the larva and adult, and especially to the cells of the germinal blastema and the leucocytes. He demonstrated for this vertebrate a distribution and functional activity of the archoplasmic body identical with that recorded by Platner for the invertebrate *Helix;* and concluded that the archoplasmic body is the sole agent in the formation of the achromatin spindle-fibres.

(5) Prof. J. C. Stewart exhibited with remarks an abnormal fore foot of a horse, in which two large digits and vestiges of others were present.

(6) Dr. G. Mann read a paper on the Origin of Sex, in which he contended that any sexual cell might be transformed into either a male or female cell, according to the facilities of acquiring and assimilating food material.

(7) Dr. J. Beard, on Larvæ and their Relations to Adult Forms. The author attempted to show that all metazoa above cœlenterata developed through the intermediation of a larva (often disguised by the presence of food yolk), and, in fact, upon the latter. He urged that the recapitulation theory was no explanation of the phenomena of embryology; at best it held good to a limited extent for the ontogeny of certain organs. The views of the author led him to regard metazoon development as a sort of alternation of generations.

(8) Professor W. A. Herdman, F.R.S., on the Exploration of the Irish Sea to the south of the Isle of Man now being carried on by the Liverpool Marine Biology Committee.

On Saturday, August 6th, the section did not break up into departments. The following papers were read:—

(1) Prof. McKendrick, F.R.S., demonstrated by means of a new form of myograph a method of recording and projecting simultaneously upon a screen, through the aid of lime light, curves of muscular contraction. He also showed a method of measuring and recording the time occupied by short voluntary movements, such as those of the fingers in writing, or the movements of the tongue.

(2) Prof. G. Fritsch (Berlin), on the Origin of the Electric Nerves in the *Torpedo, Gymnotus, Mormyrus,* and *Malapterurus.* Prof. Fritsch pointed out that there are two kinds of electric organs found, the one being modified muscles, as is the case in *Torpedo, Gymnotus, Mormyrus,* and *Raia,* while the other belongs to the cutaneous system, and is probably transformed gland cells of the skin, as in *Malapterurus.* In electric organs originating from muscles there are many ganglion cells, but in those derived from skin organs there are only two ganglionic cells, one on each side, and only one nerve fibre belonging to each cell, which fibre is formed by a combination of protoplasm-processes at a certain distance from the gigantic ganglion cell.

(3) Prof. Miall, F.R.S., gave an account of the leaf of the water plant *Victoria regia,* illustrated by lantern slides, in which he described the peculiarities of its structure, and the way in which it is modified to suit its special environmental conditions.

(4) Dr. J. Musgrove, the Blood-vessels and Lymphatics of the Retina. The author pointed out that the distribution of the vessels in the retina was as regular as that occurring in the arm or the leg. The blood-vessels of the retina of the ox may be divided into three sets. There are upper and lower sets of branches of large vessels, and there is an intermediate zone entirely free from large vessels except in so far as it is traversed by the main stems of artery and vein in their course to the upper part of the retina. This intermediate zone the author regards as the homologue of the yellow spot found in the human retina. The capillary vessels on a transverse section of the retina are seen to lie chiefly in the nerve cell layer, the inner molecular layer, and the inner nuclear layer. Only rarely are capillaries found beyond the inner nuclear layer, and they never extend as far as the outer nuclear layer, so that the outer layers (the rods and cones, &c.) are entirely free from vessels.

(5) Mr. H. O. Forbes exhibited a recently discovered series of sub-fossil bones of extinct birds of New Zealand and the Chatham Islands, and made remarks upon the localities where they had been found and upon their distribution. From the Chatham Islands the specimens were in a remarkably fine state of preservation, and included the species described under the names of *Aphanapteryx hawkinsi, Fulica newtoni,* and *Corvus moriorum,* along with portions of *Nestor* and *Harpa.* From New Zealand, *Bizuira, Cereopsis, Cygnus,* and the type specimens of *Cnemiornis gracilis,* Forb., were exhibited, and also the larger part of the skull of *Harpagornis moorei,* Haast.

(6) Dr. J. Clark, on the Natural Relations between Temperature and Protoplasmic Movements. The author showed that the minimum temperature for protoplasmic movements depended on the nature, habits, and natural surroundings of the plants, and that change of conditions of growth induced change of minimum.

(7) Dr. J. Clark, Experimental Observations on the Functions of the Nucleus in the Vegetable Cell. By divesting the vegetable cell of its wall, and also by mechanically separating the protoplasmic contents of a cell into two equal parts, the author tried to show the relations between the nucleus and cell-wall formation, and between mechanical stimulus and nuclear activity.

(8) Dr. Francis Warner, Co-ordination of Cellular Growth and Action by Physical Forces. The facts accumulated in a report on 50,000 children observed by the author appear to show that defects in development of the body are largely co-related with defects of the nerve system in its power of co-ordination and mental function.

(9) M. Louis Olivier, La Canalisation des Cellules et la Continuité de la Matière vivante chez les Végétaux et les Animaux. The author has for some time recognized, even in highly differentiated tissues, the canalization of the cell wall and the free passage of protoplasm; and lately he has obtained evidence, photographic and otherwise, that in highly organized forms, such as Dicotyledons, the protoplasm is continuous from the extremity of the roots to the tips of the leaves.

(10) Dr. John H. Wilson, some Albucas and their Hybrids. The author has formed crosses between hybrids and the parent forms in several species of the African liliaceous genus *Albuca.*

On Monday, Section D was occupied in the forenoon by a discussion on "Sea-Fisheries":—

(1) Prof. McIntosh, F.R.S., opened the discussion by a paper entitled "A Sketch of the Scotch Fisheries, chiefly in their scientific aspects, during the past decade, 1882-92," in which he gave an interesting account of the condition of the fisheries, and of the investigations which have been carried on by the Fishery Board of Scotland, and at the St. Andrews Marine Laboratory, and elsewhere.

(2) Prof. Ewart followed with a general paper on our sea-fisheries, in which he showed that some of our valuable fishes are becoming scarce, and discussed various remedial measures which have been suggested. He considered that fish-hatching was not of much practical use if the young were merely returned to the sea when hatched.

(3) Mr. E. W. L. Holt read a paper, drawn up by himself and Messrs. W. L. Calderwood and J. T. Cunningham, of the Marine Biological Association, on the Destruction of Immature Fish, and a discussion of remedial measures. In this paper the authors dealt chiefly with the protection of immature fish by the imposition of a size limit. It was contended that the size limits proposed at the conference at Fishmongers' Hall last February are altogether too small, and that no limit can be useful which is not based upon the size at which a fish is for the first time able to reproduce its species. Tables were given showing the variation which exists in this respect in the different districts. The authors gave figures showing the immense destruction of immature fish on certain grounds lying on the east side of the North Sea, and the opinion was expressed by Mr. Holt, who has had

charge of the Association's work in that district, that the imposition of a reasonable size-limit for plaice alone would do more to cause the trawlers to leave these grounds unmolested than could be effected by any scheme of closing based on international agreement.

Various zoologists and fishing experts, including Prof. Ray Lankester, Prof. McIntosh, Prof. Ewart, Dr. Fullerton, Mr. Olsen, Mr. Stebbing, Mr. Walker, and Prof. McKendrick, took part in the discussion which followed.

(4) Dr. W. Ramsay Smith, The Food of Fishes. This statistical paper gives the result of observations made by the naturalists of the Fishery Board for Scotland on over 10,000 food fishes collected in the Firth of Forth and St. Andrews Bay during the last four years. The author considers the statistics so extensive as to reduce the limit of the errors of observation to such an extent as to allow general conclusions of a trustworthy character to be drawn now for the first time.

(5) Mr. E. W. L. Holt, Notes on Teleostean Development.

(6) Mr. A. P. Swan, The Effect of Sea-water on the Vitality of the Salmon Fungus. The author showed that immersion in sea water even diluted with any lesser proportion than three parts of fresh water is fatal to the fungus; and from the continuous nature of the hyphæ it is certain that the disease is destroyed on the stay of the fish in the sea, and that the recurrence of the disease on the return to fresh water must be due to re-infection. In the discussion that followed Mr. George Murray expressed his acceptance of the author's results.

(7) Prof. E. G. Prince, on the Formation of Argenteous Matter in the Integument of Teleosteans. The fibrillated substance to which the integument of many fishes owes its silvery lustre is formed in a layer of granular plasma which belongs to the mesoderm.

(8) Prof. E. E. Prince, The Development of the Pharyngeal Teeth in the Labridæ. The grinding plates in the pharynx of wrasses are developed from rounded dental sacs formed from the cells of the mucous layer.

(9) Dr. Carlier, on the Skin of the Hedgehog. The skin of the dorsal surface is very thick, and very rugose. The spines spring from depressions between the rugosities. On section the mucosa is very thick, and devoid of blood vessels except beneath. Sweat and sebaceous glands are absent: radiation of heat is thereby almost prevented. The spines which are morphologically hairs, are fixed in the cutis vera by a broad base, near which is a rich capillary plexus. The spines, consist of cuticle, cortex, and medulla. The cortex is strengthened internally by twenty-two or more longitudinal septa. The medulla is divided into loculi by transverse imperforate septa, which divide at their margins into secondary septa, which again divide into tertiary, enclosing respectively secondary and tertiary loculi. The erector pili is very large, and somewhat fan-shaped. The skin of the ventral surface is much thinner, and is covered with soft hairs between which and the spines there is a gradual transition on the flanks. Sebaceous and sweat glands are present, and also much adipose tissue, and a thin skin muscle.

(10) Rev. Alex. S. Wilson, on the Industry and Intelligence of Insects in relation to Flowers.

(11) The following demonstrations were also given:—Dividing Pollen Mother Cells, by Prof. M. Hartog; Hibernating Gland of Hedgehog, by Dr. Carlier; Variations in Arrangement of Feathers in Wings of Birds, by Mr. Goodchild; Embryo-sac of Angiosperms, by Dr. G. Mann.

On Tuesday, Aug. 9, the Section again separated into Departments. In the Botanical Department, papers were read by Prof. Schmitz (Knöllchen am Thallus einiger Florideen), Mr. Carruthers (on the Structure of the Stem of a typical Sigillaria), Mr. T. Hick (on Calamostachys Binneyana), Mr. A. C. Seward (on Myeloxylon from Millstone Grit and Coal Measures), Prof. Hillhouse (Disappearance of native Plants from their local Habitats), and others which will be noticed elsewhere.

Mr. G. Murray drew attention to a comparison of the Marine Floras of the warm Atlantic and Indian Ocean, his remarks being illustrated by a printed table of statistics. He dealt with the question whether since the last period of a warm climate at the Cape when the two tropical marine floras mingled, the genera and species had had time to vary much, or remained the same in the warm Atlantic and Indian Oceans now separated by the colder flora at the Cape.

Mr. Harold Wager read a paper on the Structure of *Cystopus candidus*, a fungus found parasitic on the shepherd's purse. He pointed out that the nuclei are similar in structure in many respects to the nuclei of higher plants. In the formation of the oospore a number of nuclei are restricted to the periplasm, and at a late stage a number of nuclei are found in the oospore surrounding a large central oil globule. During fertilization the protoplasm and nuclei contained in the antheridium pass over into the fertilizing tube, but whether any of the contents pass into the oospore was not determined.

A paper, by Mr. James Britten, was read protesting against certain proposed changes in Botanical nomenclature.

Two papers were given by Prof. G. Gilson (Louvain), on the Affinity of Nuclein for Iron and other substances, and a Method of Staining Nuclei by Chemical Means. It is now certain that dead nuclein, as well as other substances found in the cell, have a strong affinity for the various compounds of iron and of other metals and negative chemical bodies. Thus the difficult question arises, Is the presence of iron in the nuclear elements constant and normal during life, and is this metal necessary for the chemical activity of the nucleus?

Dr. C. H. Bailey, Manchester, discussed the conditions affecting plant life in a town atmosphere, especially the falling off in the amount of light received, and the increase in sulphurous acid. Finally, a paper was read by Dr. G. Mann, which contended that the view first put on record by the author, viz., that the embryo-sac of Angiosperms corresponded to a sporocyte, and not a macrospore, was confirmed by the observations of Guignard, Dodel, and Overton, and that the eight cells within the embryo-sac were eight female sexual cells corresponding to the eight male sexual cells derived from a pollen mother-cell.

In the Department of Zoology the following papers were read:—

(1) Baron Jules de Guerne, Présentation de Planches inédites de Zoologie concernant les Recherches du Yacht *l'Hirondelle*.

(2) Baron Jules de Guerne, Crustacés Copepodes des Eaux sursaturés de Sel de la France et des Canaries.

(3) Dr. Arthur Robinson, Observations on the Development of the Posterior Cranial and Anterior Spinal Nerves in Mammals. At an early stage (eleven protovertebral somites) a continuous cord of nerve cells extends backwards from just within the posterior part of the auditory depression along the dorsolateral angle of the medulle and spinal cord. At the time of formation of the secondary optic-cup this cellular cord loses a connection it had with the dorsal extremity of the neural tube, thickens between auditory vesicle and first somite, remains relatively small from first to fourth somite, and beyond the fourth somite gives origin to a series of swellings, the spinal ganglia. The ganglionic enlargement in the presomitic region becomes the root-ganglia of the glosso-pharyngeal and vagus nerves. An enlargement in relation with the fourth somite becomes the first cervical ganglion. Other enlargements in second and third somites become connected either with spinal accessory or (in cat) with posterior root of hypoglossal nerve.

(4) Prof. J. C. Ewart, on the Cranial Ganglia. The author discussed chiefly the ganglia of the glossopharyngeal and facial nerves in elasmobranch fishes, and their relations to the branches of the cranial nerves.

(5) Prof. W. A. Herdman, F.R.S., gave two short notes, one on the Geographical Distribution of Ascidians, in which he drew attention to the great predominance of species and individuals, and also of gigantic specimens in Arctic and in Antarctic seas; the other on the Presence of Atrial Tentacles in various genera of Tunicata, with a suggestion as to their function. The various forms in which up to now atrial tentacles have been found are phylogenetically rather closely related, and most of them are species in which the animals are in the habit of living closely aggregated together. Possibly under these crowded conditions it is an advantage to the animals to have the power (as some have) of reversing the usual current of water, or of using the atrial for a time as the inhalent aperture, when the atrial tentacles would have important functions to perform.

(6) Mr. E. B. Poulton, F.R.S., gave two interesting exhibitions of series of specimens, the one illustrating renewed experiments on the modifications of the colours of Lepidopterous pupæ, and the other being an observation bearing on the non-transmission of characters acquired by certain pupæ.

(7) Dr. J. Symington, on the Cerebral Commissures in the Marsupialia and Monotremata. The author held that in these two divisions of the Mammalia the Corpus Callosum was absent, the only transverse fibres that exist being those known as the

hippocampal commissure and the anterior commissure. These results support the conclusions of Owen, and are opposed to those of Flower.

(8) Prof. J. Playfair McMurrich, the Early Development of the Isopods. The author described the structure and mode of segmentation of the typical centrolecithal ovum of the Isopod *Jæra*, calling attention to the early differentiation of the germ layers, which may be traced back to the eight-celled stage. The mesoderm forms at first a band of cells surrounding the embryo, and later concentrates towards the ventral surface to form the blastodisc, behind which is the endoderm, these two layers becoming later enclosed by the ectoderm, which grows back over them by teloblastic proliferation.

(9) Dr. J. Beard gave some notes on Lampreys and Hagfishes.

(10) Prof. G. B. Howes and Mr. J. Harrison, on the Skeleton and Teeth of the Australian Dugong. The authors described the process of vertebral-epiphysis formation, showing that epiphyses, so far as represented, are formed late, and are rapidly merged into the substance of the vertebral body. They described the formation of structures which might, perhaps, be regarded as anticipatory of supernumerary phalanges, and pointed out that their observations lent no support to Kukenthal's view of the epiphysial nature of such phalanges. Five mandibular teeth were found to be present in the anterior region of each ramus in the manatee, and one of these they claimed as a canine. They recorded the discovery of milk predecessors to the first upper and the four lower incisors (?) of the dugong, and of the two anterior mandibular cheek teeth of the manatee; and discussed the bearings of these facts on the inter-relationships and affinities of the order Sirenia.

(11) Dr. H. C. McCook—Can Spiders Prognosticate Weather Changes? Dr. McCook first stated briefly the widespread popular opinion that spiders fairly indicate the weather by ceasing to spin before foul weather, and weaving freely before fine weather. He then gave a few extracts from his journal of observations on this point extending over six years, the tenor of which is that the popular opinion has no basis in fact. Many species of orb-weavers, which were colonized and kept under close observation, made snares freely before rains and storms, frequently even in the intervals between heavy rains.

(12) Mr. G. Swainson, some Notes on Marine and Freshwater *Chironomus*.

(13) Rev. Hilderic Friend, on British Earthworms. The author distinguishes between the four genera—*Lumbricus*, *Allolobophora*, *Allurus*, and *Dendrobæna*—to which British earthworms belong, and gives an account of the different species, some of which are new to science.

(14) Mr. H. Newman Laurence, the Human Body as a Conductor of Electricity.

(15) Prof. J. B. Haycraft, Fertilization of the Eggs of the Stickleback.

The two following papers, also on the programme, were taken as read:—

(16) Prof. Emile Yung, la Fonction Dermatoptique chez le Ver de Terre, and

(17) M. J. Richard, Note sur l'Œil Latéral des Copepodes du genre Pleuromma. The lateral eye in *Pleuromma* is variable in position, but is more often on the right side than on the left, and seems more constant in males than in females.

The following demonstrations were also given during the afternoon:—The Formation of Pearls (by Mr. Albert F. Calvert), Interesting British Food Fishes (by Mr. E. W. L. Holt), and the Structure of *Myeloxylon* (by Mr. A. C. Seward).

GEOGRAPHY AT THE BRITISH ASSOCIATION.

THE work of the Geographical Section was overtaken in four meetings, the large attendance at which was evidence that the papers read met at least with popular approval. It is more satisfactory to gather from the opinions expressed by specialists that many of the papers were solid and original, and that from the scientific standpoint the average work was of high excellence. Without doubt the most important of the new results announced to the Section was Dr. Schlichter's admirable development of a photographic process for determining longitude by the almost disused method of lunar distances. The practical value of the invention is very great, especially with regard to the mapping of partially known continents.

Like all other departments of the Association, Section E owed much of its success to the distinguished foreigners who took part in its proceedings. The papers by the Prince of Monaco and the occasional remarks of Baron von Richthofen were much appreciated. Two ladies read papers, Mrs. Bishop recounting her adventures on the borders of Tibet with her well-known literary grace, and Mrs. Grove giving a short, bright account of the rainless regions of Chile.

Prof. James Geikie's presidential address, although based entirely on geological reasoning, was truly geographical in so far as it utilized geology only for the purpose of explaining the origin of the existing surface conditions of the globe. As presenting the only sound basis of physical geography, this opening address proved to be one of the best and most original with which Section E has ever been favoured. Unfortunately, Prof. Geikie was prevented by illness from presiding at all the meetings, but his place was taken by the vice-presidents, Colonel Godwin Austen, Mr. H. J. Mackinder, Mr. E. G. Ravenstein, and Mr. Coutts Trotter.

The First Ascent of Oraefa Jökull.—In the absence of the author, Mr. J. Coles read an account by Mr. F. W. W. Howell of the first ascent of Oraefa Jokull in Iceland. Mr. Howell succeeded in making the ascent on August 12 last year, after several previous failures. Although only 6550 feet in height the mountain presented remarkable difficulties on account of the irregularity of the ice.

Place Names.—Dr. J. Burgess, in the course of a paper on place names, urged a uniform system of transliteration from Oriental alphabets as more scholarly and more satisfactory than any attempt to represent the sound of names phonetically. In no other way could uniformity of spelling be arrived at, and the diverse spellings now in use made the study of Asiatic geography in particular very toilsome and irritating. With regard to Gaelic names there were several serious errors in spelling on the ordnance map, but at the suggestion of Sir Charles Wilson a Committee of the Royal Scottish Geographical Society had taken the matter up, and aided by local committees were introducing important corrections. A lively discussion followed the reading of this paper, in which Sir Charles Wilson, Mr. Mackinder, Prof. Thomas Smith, and others took part. A Committee of the Association was formed to co-operate with the Scottish Society, and received a small grant to aid in the thorough revision of the orthography of Gaelic place names.

Effects of Rainfall in Formosa.—Mr. John Thomson, of London, gave an account of the effect of rainfall on the scenery of Formosa, illustrated by a number of fine photographs. The situation of the island and its mountainous structure conspire to give prominence to the effect of rain-action; the wind blowing in from the warm current of the *Kuro Siwo* strikes against a mountainous ridge which runs the whole length of the island and culminates in a summit 12,000 feet high. The mountain side to windward is scored with deep ravines, and the streams choked with huge boulders in course of transport to the coast-plains, which are deeply covered by fine alluvium washed down from the heights.

The Windings of Rivers.—Mr. J. Y. Buchanan, in a short paper, discussed the windings of rivers from the standpoint of hydrodynamics.

Lesser Tibet.—Mrs. Bishop (Miss Isabella Bird) described a journey undertaken in 1889, on the borderland of Tibet, which she approached from Leh, in Kashmir. The intensity of radiation at great altitudes, giving very hot days and cold nights, was observed to lead to a very rapid disintegration of the rocks, resulting in the formation of immense fields of gravel. Although presenting a vivid picture of the topography and scenery of the trans-Himalayan borderland, Mrs. Bishop entered more fully into the characteristics of the people, contrasting the false, suspicious, and cringing natives of Kashmir with the truthful, trustful, and independent people of Tibet, who always welcomed her warmly and dealt with her fairly.

The North Atlantic.—The Prince of Monaco read two papers on his oceanographical work, the first bearing on his experiments with floats on the surface circulation of the Gulf Stream, and its associated system of currents. About 10 per cent. of the floats thrown over from the Prince's yacht have been recovered, and by taking into account the position in which they were found and the date, important confirmation of the theoretical system of circulation was obtained. The current was found to be a circular whirl, with its centre a short distance south-west of the Azores. Floats thrown over near the centre were not re-